Chinchilla lanigera (Molina 1782) and *C. chinchilla* (Lichtenstein 1830): review of their distribution and new findings

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Abstract

Chinchilla lanigera *(Molina 1782) and* C. chinchilla *(Lichtenstein 1830): review of their distribution and new findings.*— Millions of *Chinchilla chinchilla* and *C. lanigera* were killed during the early twentieth century and they were nearly hunted to extinction. In order to establish the current range of distribution of these two wild species and to localize possible new colonies, we used the available scientific literature, technical reports, information from residents, and live trapping methods. Both species are 'critically endangered' since their current distribution is highly fragmented and all recognized colonies are small and isolated. We report a small new wild colony of *C. lanigera* in the Atacama region, Chile.

Key words: *Chinchilla,* Critically endangered, Distribution, Endemism, New colonies, Chile

Resumen

Chinchilla lanigera *(Molina, 1782) y* C. chinchilla *(Lichtenstein, 1830): revisión de su distribución y nuevas observaciones.*— Tanto *Chinchilla chinchilla* como *C. lanigera* estuvieron muy cerca de la extinción debido a la caza histórica y masiva de que fueron objeto, y que acabó con millones de ejemplares durante la primera parte del siglo veinte. Para determinar el rango de distribución de estas especies y localizar nuevas colonias, analizamos las publicaciones científicas, los informes técnicos, la información facilitada por personas residentes y los trampeos en vivo. Detectamos una nueva colonia silvestre de pequeño tamaño de *C. lanigera* en la región de Atacama, Chile. El estado de conservación de ambas especies sería de “en grave peligro de extinción”, ya que la distribución está muy fragmentada y la mayor parte de las colonias detectadas son pequeñas y están aisladas.

Palabras clave: *Chinchilla*, En grave peligro de extinción, Distribución, Endemismo, Nuevas colonias, Chile

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Introduction

Chinchilla chinchilla (Lichtenstein, 1830), commonly known as the short–tail or Andean chinchilla, is a rodent of the family Chinchillidae. The historical distribution of this chinchilla included the highlands of Chile, Argentina, Peru and Bolivia (Chacón, 1892; Walle, 1914; House, 1953; Grau, 1986; Jiménez, 1996; Anderson, 1997; Eisenberg & Redford, 2000; Parera, 2002; Woods & Kilpatrick, 2005). *C. lanigera* (Molina, 1782), on the other hand, is traditionally known as the long–tail or coastal chinchilla, and it is endemic to north–central Chile (Jiménez, 1996; Valladares, 2002; Spotorno et al., 2004a). In the past, however, it had a wider distribution (Grau, 1986; Jiménez, 1996), ranging from the Choapa River (32°S) to north Potrerillos (26°S).

Over seven million chinchilla furs were exported from Chile during the first part of the twentieth century (Albert,1900). However, this represented only one third of the total number of captured chinchillas as many furs were damaged as a result of the hunting methods used and discarded (Albert, 1901). It is therefore estimated that more than twenty million specimens were killed in Chile during this period. Even though both species were considered extinct during the 1960s, *C. chinchilla* was rediscovered in the highlands of the Antofagasta region in Chile by Spotorno et al. (1998) and *C. lanigera* was found near Illapel, Coquimbo region, Chile (Mohlis, 1983). More recently, a colony of *C. lanigera* was documented near La Higuera, North of the Coquimbo region (Spotorno et al., 2004a).

This study presents the new colony of *C. lanigera*. We also discuss the range of distribution of the two species of chinchillids in northern Chile based on the information available.

Material and methods

To assess the distribution, ecology and conservation status of the two species we analyzed all the scientific information available (*e.g.* Jiménez 1987, 1989, 1995, 1996; Spotorno et al., 1998; Cortés et al., 2002, Spotorno et al., 2004a, 2004b; Valladares, 2012; Valladares et al., 2012; Tirado et al., 2012; Lagos et al., 2012) in technical and public reports (*e.g.* Mohlis, 1983; Schlatter et al., 1987; Lagos et al., 2008; Martínez & Cortés, 2011; Povea et al., 2012). We revisited the sites where the chinchilla species have been observed to confirm their presence. Live trapping, feces and hair collection, and cave and pawprint identification were carried out to establish the presence of chinchillas. We describe the microhabitat, vegetation and the presence of other sympatric species of the newly discovered colonies.

Results

According to current scientific literature, *C. chinchilla* has been documented in restricted areas of Chile, most specifically around El Laco and Morro Negro towns, both near the Llullaillaco volcano, Antofagasta region (Spotorno et al., 1998; Spotorno et al., 2004b; Tirado et al., 2012) and also near the Nevado Tres Cruces National Park and its surroundings, in the Atacama region (Valladares et al., 2012) (fig. 1A). In Argentina it has been documented near the Antofalla, Catamarca (Walker et al., 2007), southwestern Jujuy (Olrog & Lucero, 1981), Salta (Ortiz et al., 2010), La Rioja (Parera, 2002) and northern San Juan (Cajal et al., 1981). In Bolivia, its distribution included the departments of La Paz, Oruro and Potosi (Anderson, 1997). The last wild specimen in this country was captured by residents of Huachacalla, Sabaya, and Caranga (Walle, 1914).

The distribution of *C. lanigera* includes Las Chinchillas National Reserve (Jiménez, 1995, 1996) in Aucó (about 700 ind/km^2, Cofré & Marquet, 1999) and Quebrada El Cobre (with 4.4 to 72.9 ind/km^2; Lagos et al., 2010). Some colonies have been identified outside the limits of the reserve, in the areas of Quebrada Curico and Quebrada El Cuyano (between 17.5–82.6 ind/km^2 and 12.3 to 58.3 ind/km^2, respectively; Lagos et al., 2010), while a small and isolated colony of these chinchilla has been found in Corral de Piedras, La Higuera (Spotorno et al., 2004a). No estimate, however, is available on the size of the population.

It appears that *C. lanigera* inhabited the Atacama region during the first part of the twentieth century, particularly around Vallenar (Wolffsohn, 1923), Quebrada El León (ca. 26° 57' 34.05'' S, 70° 41' 31.90'' O) (Gigoux, 1926), and Morro Copiapó (ca. 27° 7' 51.89'' S, 70° 55' 48.62'' W) (Gigoux, 1935). According to the literature, they had previously been abundant, but the massive captures were carried out in 1892, and the species was regarded as possibly extinct.

Olave & Monroy (2006) published a photograph taken in 1923 of Pablo Trabucco Onetto, with their breeding of chinchillas captured near Chañaral. Based on this evidence, we thought that finding new colonies in this province was more likely, because local residents mentioned many places where chinchillas were captured at the beginning of the twentieth century. Other authors have mentioned wild colonies of chinchillas in the north of Chile, for instance, in Mejillones (Phillipi, 1860), the Licancabur volcano (Rudolph 1955), and La Ola and Potrerillos (Schlatter et al., 1987). Grau (1986) suggested that both species may have inhabited in sympatry around Potrerillos (north of Atacama region), corresponding to the traditional northern limit of the *C. lanigera* distribution, and the native southern limit of *C. chinchilla* (fig. 1A).

A new colony was found by a group of miner–workers in the Atacama region, Chile (26° 55' 07'' S, 70° 21' 32'' W). They captured one chinchilla specimen, rescuing it from a group of domestic dogs. The specimen was taken to the Servicio Agrícola y Ganadero (SAG) of Copiapó and examined. It was a *C. lanigera* adult male, based on its long–tailed proportion (152 mm with hair and 75 mm without hair), the principal diagnostic character of *C. chinchilla* (with a tail < 110 mm long) (Spotorno et al., 2004b). Later, we visited the locality where this specimen was captured. We found another specimen between large cracked rocks. We identified another

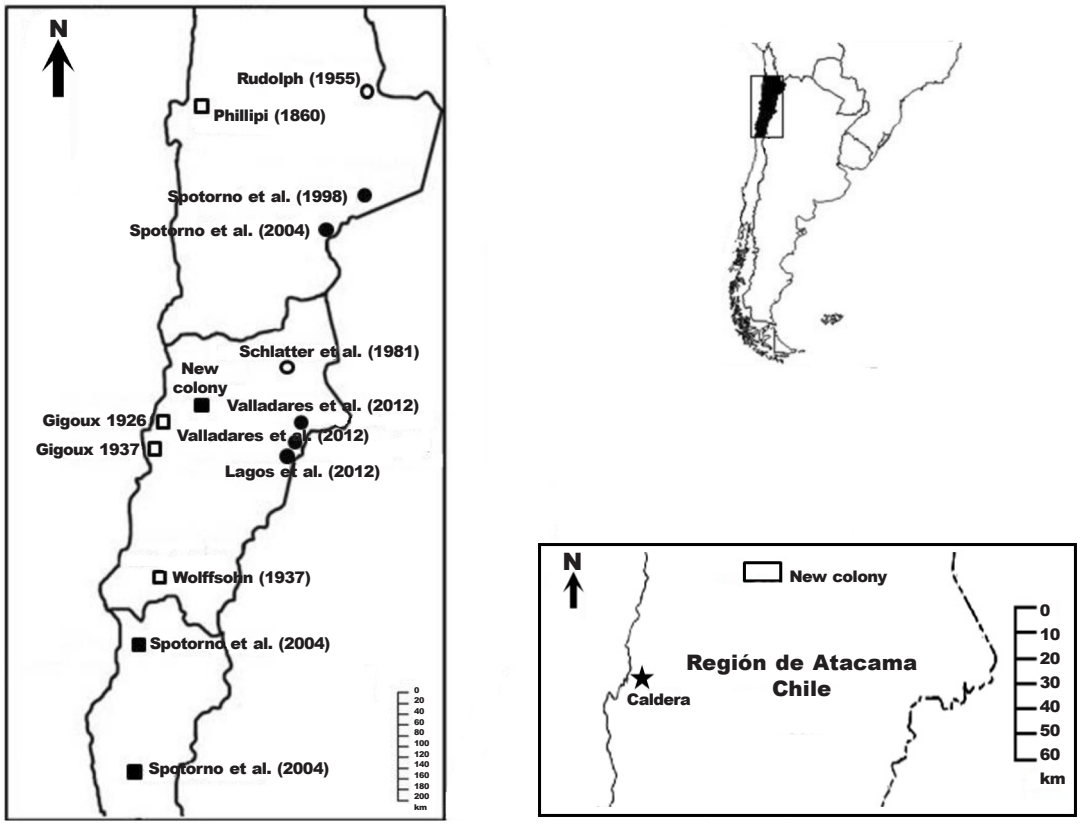

Fig. 1. A. Distribution map of *Chinchilla lanigera* (squares) and *C. chinchilla* (circles); black squares and circles correspond to confirmed colonies, and white squares and circle to colonies mentioned in the literature but not confirmed by our recent field survey); B. Locality of the new colony of *Chinchilla lanigera* from Atacama region, Chile (26° 55' 07" S, 70° 21' ´32" W).

Fig. 1. A. Mapa de la distribución de Chinchilla lanigera *(cuadrados) y* C. chinchilla *(círculos); los cuadrados y los círculos negros corresponden a colonias confirmadas, mientras que los cuadrados y los círculos blancos corresponden a colonias mencionadas por otros autores, pero que no hemos confirmado en nuestro reciente estudio de campo; B. Localidad de la nueva colonia de* Chinchilla lanigera *de la región de Atacama, Chile (26° 55' 07" S, 70° 21' 32" O).*

42 points with feces, footprints and/or wallows, nine of which showed recent activity. We roughly estimated a density of some 24.7 to 115.4 ind/km^2.

This new colony was located 44 km from the coast, inhabiting the middle of an extremely arid hill, approximately 1,150 m in height, and surrounded by extensive dunes of the Atacama Desert (fig. 1B). The vegetation was identified as *Heliotropium sclerocarpum*, *Tetragonia microcarpa*, *Gymnophytum flexuosum*, *Nolana* sp., and particularly *Eriocyse aurata*, probably the main source of water and food. Some 87% of cactus showed signs of being gnawed by rodents. No other sympatric species were reported, but *Phyllotys darwini* and *Eligmodontia dunaris* have been collected near this area (Valladares, 2012; Spotorno et al., 2013). An owl, *Bubo magallanicus,* was observed as possibly the only predator in the zone, although foxes have occasionally been observed by miners.

Another new colony was reported by the mining company 'Cerro Blanco' belonging to White Mountain Titanium Corporation, close to Vallenar, Atacama region. They mentioned in their line base a record of *C. lanigera* in winter, 2012 (http://seia.sea.gob.cl/expediente/expedientesEvaluacion.php?modo=ficha&id_expediente=7895426).

Regarding *C. chinchilla,* colonies were reported in the Atacama region by the mineral project Salares Lithium Company that was developing a survey of the 'Salares 7' (http://seia.sea.gob.cl/documentos/documento.php?idDocumento=6326647). They described the presence of vertebrates, showing a photo of the footprints of *C. brevicaudata* [sic]. The 'Salares Norte Mining' from Gold Fields Salares Norte Company showed a wild specimen (http://seia.sea.gob.cl/documentos/documento.php?idDocumento=8230878). However, the population density of these colonies was not assessed.

Discussion

Based on the available evidence, it seems clear that the past distribution of both wild species was indeed extensive. *C. chinchilla* was distributed in southern Peru, Bolivia, and northern Argentina and Chile (Grau, 1986); nonetheless, it has not been documented in Bolivia, Peru and Argentina in the last 50 years. Furthermore, the colonies identified in Chile are small and restricted to the Antofagasta and Atacama regions. On the other hand, *C. lanigera* is an endemic species occupying an area from Antofagasta to the Coquimbo regions (Grau, 1986). However, after a massive extermination, their distribution became restricted to Las Chinchillas National Reserve (Mohlis, 1983), and to a small colony located in the north of the Coquimbo region (Spotorno et al., 2004a). Both species have been reduced to less than 95% of their original distribution and important biological variables regarding their conservation status have not been assessed in the observed colonies.

The new colony reported here is a small and isolated population, inhabiting small hills surrounded by a vast desert. We were unable to locate any nearby colonies. One possible explanation is that the existing colonies of *C. chinchilla* are extremely small and isolated with respect to other group (Valladares et al., 2012; Lagos et al., 2012). The highly fragmented and small mammalian populations generally have a low genetic diversity and a high level of inbreeding. These factors have consequently reduced their fitness, thereby increasing their risk of extinction (Keller & Waller, 2002). It is imperative to analyze their genetic diversity to compare them with those of the other populations that have low reported values (Spotorno et al., 2004a). Such studies could provide greater insight into what its future conservation needs may be.

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